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EXAMINER

LOPEZ, FRANK D

ART UNIT PAPER NUMBER

3745

DATE MAILED: 03/02/2004

*19*

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/981,414

Applicant(s)

RIBEIRO ET AL.

Examiner

F. Daniel Lopez

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 2-13,16,17,19-34,36-66 and 70 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.

- 5) ☒ Claim(s) 36-66 and 70 is/are allowed.

- 6) ☒ Claim(s) 2-13,16,17 and 19-34 is/are rejected.

- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.

- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other: \_\_\_\_

***Response to Amendment***

Applicant's arguments filed November 26, 2003, have been fully considered but they are not deemed to be persuasive.

Applicant's arguments with respect to claims 2-13, 16, 17, and 19-34 have been considered but are deemed to be moot in view of the new grounds of rejection.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Claim Rejections - 35 USC § 103***

Claims 2-8, 13, 16, 17, 19-24, and 26-34 are rejected under 35 U.S.C. § 103 as being unpatentable over Jarrett in view of Kemnitz, Berchem et al, Reinberger and Alexandrescu. Jarrett discloses a method of making a piston comprising forging a blank of steel to produce a one piece forged lower (44) steel crown part, which includes a portion of the piston head and a piston skirt (110) in one piece with a pair of pin bosses (150) wherein the bosses include tapered inner faces (e.g. column 4 line 62-67) set at an angle such that the width of the bosses increase continuously across the bores, and separated by a lateral space; forging a piston head (42) having a ring belt with a plurality of ring grooves (66, 68, 70) formed therein and a combustion bowl (46); the bosses extending downwardly from the piston head and having pin bores (118) aligned along a common axis transverse to a longitudinal axis of the head; a cavity (formed in part by 144, 102) being an oil gallery located above the bores in open communication with the space and being undercut in the bosses so as to extend laterally outwardly of the inner faces of the bosses in the direction of the boss axis; friction welding (column 5 line 50) the upper (42) and lower (44) forged steel crown parts together to form adjoined inner walls forming the inner wall and having a friction welded joint passing through the cavity; wherein the piston head includes a second oil cooling gallery (140) with a closed bottom end; but does not disclose that the piston skirt includes a pair of opposed skirt portions spaced from the bosses and intervening strut portions extending between and uniting the skirt portions to the bosses, with the strut portions presenting outer surfaces

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facing in opposite directions along the bore axis and having lower edges, with recesses, symmetrical about a longitudinal axis containing the pin bore axis and the longitudinal axis, formed in the strut portions; that the skirt portions have an upper free edge spaced and decoupled from the upper crown portion; that the method of making the piston includes die forging a steel blank in a first axial direction, longitudinally of the piston, to produce the bosses, the skirt and a portion of the oil gallery; or further forging the blank in a second axial direction in line with the pin bore axis, to produce the recesses and further recesses; and forging an oil drain access opening in areas inaccessible by forging in the longitudinal direction.

Alexandrescu teaches, for a piston comprising a piston head having a ring belt (4) with a plurality of ring grooves formed therein and a combustion bowl (6); a pair of pin bosses extending downwardly from the piston head and having pin bores (7) aligned along a common axis transverse to a longitudinal axis of the head; and a piston skirt in one piece with the bosses; that the piston has an oil drain access opening (55) in areas inaccessible by forging in the longitudinal direction, for the purpose of allowing the oil groove to drain oil, there by preventing choking of oil between the rings (column 2 line 33-43).

Since Jarrett and Alexandrescu are both from the same field of endeavor, the purpose disclosed by Alexandrescu would have been recognized in the pertinent art of Jarrett. It would have been obvious at the time the invention was made to one having ordinary skill in the art to add an oil drain access opening in areas of the piston of Jarrett inaccessible by forging in the longitudinal direction, as taught by Alexandrescu, for the purpose of allowing the oil groove to drain oil, there by preventing choking of oil between the rings.

Kemnitz et al teaches, for a piston comprising a piston head having a ring belt (4) with a plurality of ring grooves formed therein and a combustion bowl (6); a pair of pin bosses extending downwardly from the piston head and having pin bores (7) aligned along a common axis transverse to a longitudinal axis of the head; and a piston skirt in one piece with the bosses; that the piston skirt including a pair of opposed skirt portions (11) spaced from the bosses and intervening strut portions extending between and

uniting the skirt portions to the bosses, with the strut portions presenting outer surfaces facing in opposite directions along the bore axis and having lower edges, with recesses, symmetrical about a longitudinal axis containing the pin bore axis and the longitudinal axis, formed in the strut portions (the recess is relative to the outer surface of the skirt); and that the skirt portions have an upper edge either fixed to the upper crown portion (fig 4) or spaced and decoupled from the upper crown portion, by further recesses in the strut and skirt (fig 2).

Since the piston skirts of Jarrett and Kemnitz et al are functionally equivalent in the piston art; it would have been obvious at the time the invention was made to one having ordinary skill in the art to make the piston skirt of Jarrett include a pair of opposed skirt portions spaced from the bosses and intervening strut portions extending between and uniting the skirt portions to the bosses, with the strut portions presenting outer surfaces facing in opposite directions along the bore axis and having lower edges, with recesses, symmetrical about a longitudinal axis containing the pin bore axis and the longitudinal axis, formed in the strut portions; and with an upper free edge of the skirt portions spaced and decoupled from the upper crown portion, by further recesses in the strut and skirt as taught by Kemnitz et al, as a matter of engineering expediency.

Berchem et al teaches, for a method of making a piston comprising an upper crown portion (10) having a ring belt and a combustion bowl; and a lower crown portion including a pair of pin bosses (5) extending downwardly from the upper crown portion and having pin bores (7) aligned along a common axis transverse to a longitudinal axis of the head and recesses (11) in areas inaccessible by forging in the longitudinal direction; that the method includes die forging a steel blank in a first axial direction, longitudinally of the piston, to produce the bosses, and an upper surface of the blank; and further forging the blank in a second axial direction in line with the pin bore axis (by dies 22, 23), to produce the pin bores and recesses, for the purpose of minimizing machining operations after forging (column 1 line 38-45).

Reinberger teaches, for a method of making a piston comprising a ring belt, a pair of pin bosses (14) extending downwardly from a piston head and having pin bores (14a) aligned along a common axis transverse to a longitudinal axis of the head and a

piston skirt (13); that the method includes die forging a blank in a first axial direction, longitudinally of the piston, to produce the bosses and the skirt.

Since Jarrett discloses using a forged component and Berchem et al and Reinberger teaches a method of forming a forged component; it would have been obvious at the time the invention was made to one having ordinary skill in the art to make the pressed piston skirt component of Jarrett by die forging a steel blank in a first axial direction, longitudinally of the piston, to produce the bosses, an upper surface of the blank (forming the oil gallery floor), and the piston skirt; and further forging the blank in a second axial direction in line with the pin bore axis, to produce the pin bores, recess and further recess, including the oil drain access opening, as taught by Berchem et al and Reinberger, as a matter of engineering expediency. One of ordinary skill in the die forging art would know how to form the oil gallery floor and the recess by the forging operation, for the purpose of decreasing the post forging machining operations.

Claims 2-16 and 18-21 are rejected under 35 U.S.C. § 103 as being unpatentable over German 3,032,671 in view of Alexandrescu, Baster, Berchem et al and Reinberger. German 3,032,671 discloses a method of making a steel piston comprising a piston head (2) having a ring belt with a plurality of ring grooves (7) formed therein and a combustion bowl (10); a pair of pin bosses (32) extending downwardly from the piston head and having pin bores aligned along a common axis transverse to a longitudinal axis of the head and having laterally opposed edges; a pressed steel piston skirt (abstract) in one piece with the bosses including a pair of opposed skirt portions; an upper end of the piston skirt includes inner and outer walls welded to inner and outer walls of a lower end of the ring belt, forming a closed oil cooling gallery (6) in the piston head; but does not disclose that the method of making the piston includes die forging a steel blank in a first axial direction, longitudinally of the piston, to produce the bosses, the skirt and a portion of the oil gallery; further forging the blank in a second axial direction in line with the pin bore axis, to produce the recesses; forging an oil drain access opening in areas inaccessible by forging in the longitudinal direction; with the pair of opposed skirt portions are spaced from the bosses and intervening strut portions

extend between and unite the skirt portions to the bosses, with the strut portions presenting outer surfaces facing in opposite directions along the bore axis and having lower edges, with recesses formed symmetrically across a longitudinal plane containing the longitudinal axis of the piston and the bore axis, in outer surfaces of the strut portions, skirts and bosses, which extend laterally inwardly of the pin bore edges and across the longitudinal axis above the pin bore axis and are spaced from the lower edges of the skirt.

Alexandrescu teaches, for a piston comprising a piston head having a ring belt (4) with a plurality of ring grooves formed therein and a combustion bowl (6); a pair of pin bosses extending downwardly from the piston head and having pin bores (7) aligned along a common axis transverse to a longitudinal axis of the head; and a piston skirt in one piece with the bosses; that the piston has an oil drain access opening (55) in areas inaccessible by forging in the longitudinal direction, for the purpose of allowing the oil groove to drain oil, there by preventing choking of oil between the rings (column 2 line 33-43).

Since German 3,032,671 and Alexandrescu are both from the same field of endeavor, the purpose disclosed by Alexandrescu would have been recognized in the pertinent art of German 3,032,671. It would have been obvious at the time the invention was made to one having ordinary skill in the art to add an oil drain access opening in areas of the piston of German 3,032,671 inaccessible by forging in the longitudinal direction, as taught by Alexandrescu, for the purpose of allowing the oil groove to drain oil, there by preventing choking of oil between the rings.

Baster teaches, for a piston comprising a piston head (10) having a ring belt with a plurality of ring grooves (23) formed therein and a combustion bowl (19); a pair of pin bosses (32) extending downwardly from the piston head and having pin bores (33) aligned along a common axis transverse to a longitudinal axis of the head; a piston skirt in one piece with the bosses including a pair of opposed skirt portions (46); that the pair of opposed skirt portions are spaced from the bosses, with intervening strut portions extending between and uniting the skirt portions to the bosses, with the strut portions presenting outer surfaces facing in opposite directions along the bore axis and having

lower edges, with recesses (45) formed symmetrically across a longitudinal plane containing the longitudinal axis of the piston and the bore axis, in outer surfaces of the strut portions, skirts and bosses, which extend laterally inwardly of the pin bore edges and across the longitudinal axis above the pin bore axis and are spaced from the lower edges of the skirt, for the purpose of reducing an amount of oil wiped from the cylinder wall, to improve lubrication of the rings carried by the ring belt (column 4 line 3-8).

Since German 3,032,671 does not show details of a connection between the pair of opposed skirt portions and the bosses, and Baster does; it would have been obvious at the time the invention was made to one having ordinary skill in the art to space the pair of opposed skirt portions of German 3,032,671 from the bosses and use intervening strut portions to extend between and unite the skirt portions to the bosses, with the strut portions presenting outer surfaces facing in opposite directions along the bore axis and having lower edges, as taught by Baster, as a matter of engineering expediency, and with recesses formed symmetrically across a longitudinal plane containing the longitudinal axis of the piston and the bore axis, in outer surfaces of the strut portions, skirts and bosses, which extend laterally inwardly of the pin bore edges and across the longitudinal axis above the pin bore axis and are spaced from the lower edges of the skirt, as taught by Baster, for the purpose of reducing an amount of oil wiped from the cylinder wall, to improve lubrication of the rings carried by the ring belt.

Berchem et al teaches, for a method of making a piston comprising an upper crown portion (10) having a ring belt and a combustion bowl; and a lower crown portion including a pair of pin bosses (5) extending downwardly from the upper crown portion and having pin bores (7) aligned along a common axis transverse to a longitudinal axis of the head and recesses (11) in areas inaccessible by forging in the longitudinal direction; that the method includes die forging a steel blank in a first axial direction, longitudinally of the piston, to produce the bosses, and an upper surface of the blank; and further forging the blank in a second axial direction in line with the pin bore axis (by dies 22, 23), to produce the pin bores and recesses, for the purpose of minimizing machining operations after forging (column 1 line 38-45).



Reinberger teaches, for a method of making a piston comprising a ring belt, a pair of pin bosses (14) extending downwardly from a piston head and having pin bores (14a) aligned along a common axis transverse to a longitudinal axis of the head and a piston skirt (13); that the method includes die forging a blank in a first axial direction, longitudinally of the piston, to produce the bosses and the skirt.


Since German 3,032,671 discloses using a pressed component and Berchem et al and Reinberger teaches a method of forming a pressed component; it would have been obvious at the time the invention was made to one having ordinary skill in the art to make the pressed piston skirt component of German 3,032,671 by die forging a steel blank in a first axial direction, longitudinally of the piston, to produce the bosses, an upper surface of the blank (forming the oil gallery floor), including the oil drain access opening, and the piston skirt; and further forging the blank in a second axial direction in line with the pin bore axis, to produce the pin bores and recess, including the oil drain access opening, as taught by Berchem et al and Reinberger, for the purpose of minimizing machining operations after forging. One of ordinary skill in the die forging art would know how to form the oil gallery floor, the oil drain access opening and the recess by the forging operation, for the purpose of decreasing the post forging machining operations.

### ***Conclusion***

Claims 36-66 and 70 are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dan Lopez whose telephone number is (703) 308-0008. The examiner can normally be reached on Monday-Thursday from 6:30 AM -4:00 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Look, can be reached on (703) 308-1044. The fax number for this group is (703) 872-9302. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0861.

  
F. Daniel Lopez  
Primary Examiner  
Art Unit 3745  
February 20, 2004